CONFERENCE SUMMARY
Ion Motive ATPases: Structure,
Function and Regulation
June 14-17, 1992
Ritz Carlton Hotel
Cleveland, Ohio

Ion-Motive ATPase are widely distributed in cells and subcultural organelles. In the forward mode, they utilize chemical energy under the form of ATP to build ionic gradients. This energy transduction is key to excitability, contractility, secretion and overall cell function. The amount of ATP (and therefore nutrient and oxygen) consumed by these ATPases is incredibly large. Conversely, other ATPases working on "reverse" (synthetase) mode utilize ionic gradients to synthesize most of the cellular ATP.

From the early work leading to the discovery of the Na-K ATPase and the Ca^{2+} ATPase, the last twenty years have witnessed a explosive growth of information on structure, catalysis of ATPases, and new ATPase translocating different ions have been discovered. In spite of this major investment in manpower and resources and in spite of the excitement generated in this field, the major important questions on the operation of these energy transducing enzymes remain unanswered. A major goal of this conference is to discuss various ion motive ATPases to try to learn from each other and to focus on possible similarities, rather than differences, in the operation and regulation of these important enzymes.

The conference which will be held under the sponsorship of the New York Academy of Science will provide the opportunity for 46 speakers, 80 poster presenters and 150 participants to meet for four days and to exchange the latest information on the various aspect of structure, function and regulation of various ATPases. The format of the conference consists of platform presentations in the morning and poster presentations and round table discussions in the afternoons. The list of ATPases to be discussed is broad and includes Ca^{2+}, Na^{+}-K^{+}, H^{+}-K^{+}, H^{+} and Mg^{2+} transporting ATPases. Those will be discussed with respect to primary and secondary structure, catalytic sites, isozymes, dynamic structure, regulation, role of subunits, and genetic manipulation.

Four interdisciplinary round tables will focus the discussion on: evolution and structural homologies of hormonal and metabolic regulation; drug design for ATPases; and structure function relationships.

The conference will have a large international representation and a healthy mix of established and young investigators. The conference proceedings and discussion will be published timely in a well distributed volume.

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PROGRAM

This conference will provide the opportunity for 45 speakers and 200 participants to meet for 4 full days and to exchange the latest information on the various aspects of ion motive ATPases through formal presentations, open round table discussions, poster presentations and informal setting discussions.

The first day of formal presentations will be devoted to the Ca^{2+} ATPases. The new information on Ca^{2+} ATPases of the sarcoplasmic reticulum will be discussed with respect to primary structure, catalytic sites, isozymes, dynamic structure, mechanism of catalysis and regulation. The similarities and differences with Ca^{2+} ATPases of plasma membranes and that of endoplasmic reticulum will also be discussed.

The second day will be devoted to another type of P class ATPase, the Na-K ATPase. Again, primary and tertiary structure information will be discussed, together with structural information, function of isozymes and b subunits. Other K^{+} and H^{+} ATPases will be discussed from similar standpoints.

On the third day we anticipate discussion of vacuolar kind ATPase, those transporting H^{+} inside secretory vesicles, lysosomes and coated pits. A newly discovered Mg transporting ATPase and several ion motive ATPases in bacteria where genetic manipulations and engineering are possible will also be discussed.

Finally, the last day will focus on ATP synthetases. Those are the most important enzymes in ATP production in the cells and a wealth of information is emerging on molecular genetics, structure and membrane topology, subunit interaction and mechanism of ion translocation ATP synthesis.

A detailed list of the proposed speakers is included.

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FORMAT

The proposed detailed format of the 4 days is included below. Each day will consist of:

1. Approximately 10 formal presentations of one half hour including discussion during the morning. The grouping of this section is according to the type and the function of ATPases.
2. The presentation of 15-20 selected posters in the early afternoon and the informal discussion among speakers and participants.
3. Round table discussions in the late afternoon focussed on common aspects of various ATPases. This is an important integrative aspect of this conference which will foster discussion on evolution and homologies, metabolic regulation, mechanistic and structural aspects of various ATPases and, pharmacological intervention.

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While the platform presentation in the morning is organized around types of ATPases, the round table discussion will be organized with a more holistic view of common elements of various ATPases. In our experience these discussions, if properly organized and conducted, will be the highlight of the meeting where major questions, common to all ion-motive ATPases will be discussed.

A detailed list of the speakers who have accepted our invitation to participate and titles of their presentations are indicated below.

SCHEDULE

Saturday, June 13, 1992		
6:00 - 8:00 P.M.		Afternoon Registration
Sunday, June 14		
8:00 - 8:15 A.M.		Welcome and Introduction
8:15 - 10:30 A.M.		SR Ca^{2+} ATPase Structure and Function
10:30 - 11:00 A.M.		Coffee Break
11:00 - 1:00 P.M.		Plasma Membrane and ER Ca^{2+} ATPases
1:00 - 2:00 P.M.		Lunch
2:00 - 4:00 P.M.		Posters and Poster Discussion
4:00 - 6:30 P.M.		Round Table I
Monday, June 15		
8:00 - 10:00 A.M.		Na-K ATPases
10:00 - 10:30 A.M.		Coffee Break
10:30 - 1:00 P.M.		H-K ATPases
1:00 - 2:00 P.M.		Lunch
2:00 - 4:00 P.M.		Posters
4:00 - 6:30 P.M.		Round Table II
Tuesday, June 16		
8:00 - 10:00 A.M.		Archi-Bacterial ATPases, Mg ATPases
10:00 - 10:30 A.M.		Coffee Break
10:30 - 1:00 P.M.		Vacuolar ATPases and Others
1:00 - 2:00 P.M.		Lunch
2:00 - 4:00 P.M.		Posters
4:00 - 6:30 P.M.		Round Table III
8:00 P.M.		Social Dinner
Wednesday, June 17		
8:00 - 10:00 A.M.		F_{0-1} ATP Synthase Structure
10:00 - 10:30 A.M.		Coffee Break
10:30 - 1:00 P.M.		F_{01} ATPases, Regulation
1:00 - 2:00 P.M.		Lunch
2:00 - 4:00 P.M.		Posters
4:00 - 6:00 P.M.		Round Table IV

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Provisional list of speakers and other participants:

Day 1 **Ca^{2+} ATPases**

1) D.H. MacLennan (Toronto)
"Ca^{2+} ATPase of the Sarcoplasmic Reticulum"
2) K. Blasie (Philadelphia)
"Synchrotron X-ray Diffraction Studies of SR Membrane Multilayers"
3) L. De Meis (Rio de Janeiro)
"Ca^{2+} Fluxes and Energy Transduction in the Sarcoplasmic Reticulum Ca^{2+}-ATPase"
4) G. Inesi (Baltimore)
"Long Range Intramolecular Linked Functions in Activation and Inhibition of Ca2+-ATPases"
5) W.P. Jencks (Waltham)
"Reaction Steps of the Calcium ATPase of Sarcoplasmic Reticulum"

Break

6) E. Carafoli (Zurich)
"Ca^{2+} ATPase of Plasma Membrane"
7) G. Shull (Cincinnati)
"cDNA Cloning of Possible Mammalian Homologs of the Yeast Secretory Pathway Ca^{2+}-Transporting ATPase"
8) F. Wuytack (Louvain)
"The Ca^{2+} Transport ATPases and their Regulation in Muscle and Brain"
9) S. Orrenius (Stockholm)
"Ca^{2+} ATPase of Liver Endoplasmic Reticulum"

Poster Session

Round Table Discussion I
"Evolution and Structural Homologies of Various ATPases"

10) N.M. Green (London)
"Conserved Structural Patterns in the P-type ATPases and their Evolutionary Significance"
11) B. Rossier (Lausanne)
"Structure-Function Relationship of Na, K ATPase"

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Day 2 **Na-K, H-K ATPases**

1) P.L. Jorgensen (Aarus)
"Structure and Function of Renal Na, K-Pump"
2) J. Lingrel (Cincinnati)
"Na, K-ATPase: Structure Function Studies and Gene Regulation"
3) N. Modyanov (Moscow)
"Architecture of the Sodium Pump Molecule"
4) J. Kaplan (Philadelphia)
"Protein Chemical Approach to Structure-Function Relations in the Sodium Pump"
5) A. McDonough (Los Angeles)
"Regulation of Sodium Pump Isoform Expression by Ionic Stimulation"
6) E. Bamberg (Frankfurt)
"Charge Translocation in the Na^+K^+ATPase and the $H+K^+$ATPase"
7) A. Goffeau (Louvain)
"A New Proteolipid Associated to Yeast Plasma Membrane H^+-ATPase"
8) R. Serrano (Heidelberg)
"The Regulatory Domain of Fungal and Plant Plasma Membrane H^+-ATP"
9) C. Slayman (New Haven)
"Structure and Function of the Yeast Plasma-Membrane H^+-ATPase"
10) G. Sachs (Los Angeles)
"H^+/K^+ ATPase: Structure and Function"

Poster Session

Round Table Discussion II
"Hormonal and Metabolic Regulation of ATPases"

11) K. Sweadner (Boston)
"Topography of the Na-K ATPase Epitopes"
12) M. Tada (Japan)
"Molecular Mode by which Phospholamban Regulates Ca Pump ATPase from Sarcoplasmic Reticulum"

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Day 3 **Vacuolar, Mg^{2+} and Bacterial ATPases**

1) W. Epstein (Chicago)
"Structure and Regulation of the Kdp ATPase of E. coli"
2) K. Altendorf (Osnabruck)
"Potassium Transport in Bacteria: Structure and Function of the Kdp-ATPase of Escherichia coli"
3) M. Maguire (Cleveland)
"A Mg^{2+} Transporting P-type ATPase: Wrong Way, Wrong Place"
4) L. Taiz (Santa Cruz)
5) M. Forgac (Boston)
"Structure and Properties of the Coated Vesicle Proton Pump"
6) N. Nelson (Nutley)
"Molecular Biology and Site-Specific Mutagenesis of V -ATPases"
7) G. Schafer (Lubeck)
"The Plasma-Membrane ATPase of Archaebacteria"
8) P. Dimroth (Zurich)
"Sodium Translocating Adenosinetriphosphatase of Propionigenium modestum"
9) D. Stone (Dallas)
"Regulation of Endomembrane Acidification"

Poster Session

Round Table Discussion III
"Pharmacological Intervention Directed to ATPases"

10) A. Scarpa (Cleveland)
"Drug design for ATPases"

Day 4 **F. Type ATPases and ATP Synthases**

1) R.H. Fillingame (Madison)
2) M. Futai (Osaka)
"Catalytic Site of E. coli F_1 ATPase: Glycine-rich Sequence and Related Residues"
3) R. Capaldi (Eugene)
"Coupling of Catalytic Sites with the Proton Channel in the ATP Synthases"
4) J. Walker (Cambridge)
"Towards the Structure of Bovine Mitochondrial F_1 -ATPase"
5) S. Papa (Bari)
"The Polypeptide Subunits and Proton Translocating Function of the F_0 (membrane) Sector of Mitochondria H^+-ATP Synthase"
6) P. Pedersen (Baltimore)
7) Y. Kagawa (Tochigi-Ken)
8) Y. Hatefi (La Jolla)
"Recent Studies on the Mechanism of ATP Synthesis"
9) R. Simoni (Stanford)

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10) F. Yang (Beijing)
"Study on the Lipid-Protein Interaction of F ATPases"

11) F. Guerrieri (Bari)
"Alterations of Mitochondrial F_0F_1 ATP Synthase in Various Physiopathological State"

Poster Session

Round Table Discussion IV
"Structure-Function Relationship of F ATPases"

12) A. Linnane (Clayton)
"Yeast Mitochondrial ATPase: Structure/Function Studies"

13) V. Skulachev (Moscow)
"F-Type ATPase Transporting H^+ or Na^+"

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